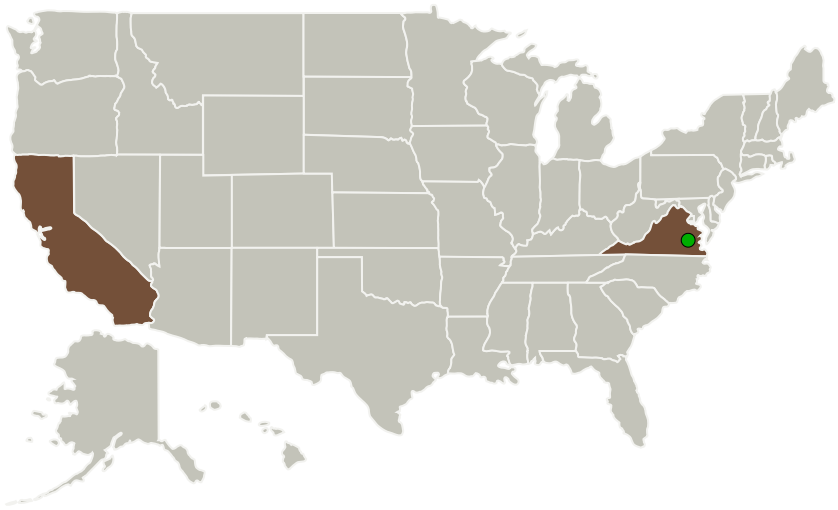
Robust Voice Communication Understanding for Single-Pilot Operations, Phase I

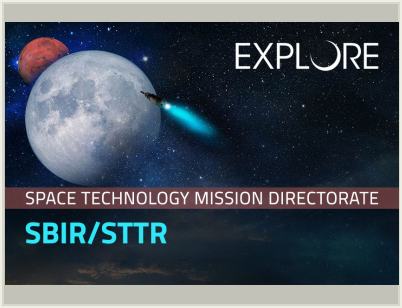
Completed Technology Project (2014 - 2014)

Project Introduction

Motivated by the anticipation of pilot shortage in the future and the quest of cost reduction in airline operations, the single-pilot operation (SPO) concept emerges as a promising alternative of the current-day multi-pilot operations. This proposal addresses the feasibility of constructing a spoken language understanding system for decoding voice communications in Air Traffic Control. In particular, we address the issue of developing a voice communication understanding system (VCUS) that would serve as one key component in both cockpit automation and ground-based automation for supporting the SPO concept. Leveraged from our prior development on noise-robust speech recognition system for the Navy and virtual agents for NASA to support human-in-the-loop simulations, an infrastructure of VCUS in Air Traffic Control of commercial flights will be developed. A feasibility demonstration of the VCUS that extracts out semantic information for persistent display of clearance message within the flight deck will be provided by the end of the Phase I research. Phase II work will utilize the infrastructure built in Phase I to expand the VCUS to a full-scale prototype that supports cockpit automation and ground-based automation for SPO.

Primary U.S. Work Locations and Key Partners





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Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Optimal Synthesis, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Los Altos, California
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Transitions

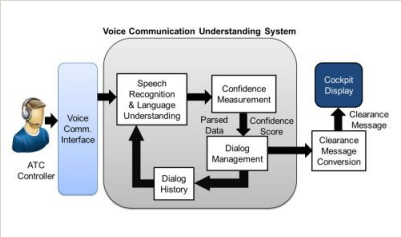
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137434)*

Images



Briefing Chart
Robust Voice Communication Understanding for Single-Pilot Operations, Phase I
(https://techport.nasa.gov/image/136861)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Optimal Synthesis, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

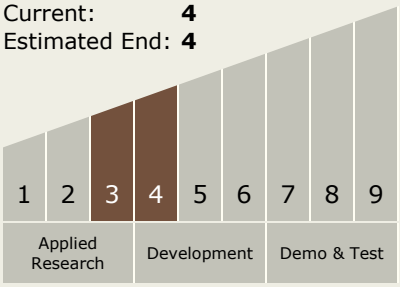
Carlos Torrez

Principal Investigator:

Hui-ling Lu

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX16 Air Traffic Management and Range Tracking Systems
  - TX16.3 Traffic Management Concepts

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System